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|  |   |    |   | Application Number       |  | 10/644,395                    |  |
|  |   |    |   | Filing Date              |  | August 19, 2003               |  |
|  |   |    |   | First Named Inventor     |  | Frederik Marcel van der Vliet |  |
|  |   |    |   | Group Art Unit           |  | 2874                          |  |
|  |   |    |   | Examiner Name            |  | Wood, Kevin S.                |  |
| SHEET  | 1 | OF | 3 | Docket Number            |  | LIGHT2700                     |  |

| <b>U.S. PATENT DOCUMENTS</b> |                       |                      |                                      |   |   |   |
|------------------------------|-----------------------|----------------------|--------------------------------------|---|---|---|
| Examiner Initials*           | Cite No. <sup>1</sup> | U.S. Patent Document |                                      | Name of Patentee or Applicant of Cited Document | Date of Publication of Cited Document<br>MM-DD-YYYY | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|                              |                       | Number               | Kind Code <sup>2</sup><br>(If known) |   |   |   |
| KSW                          | 1                     | 4,747,654            |                                      | Yi-Yan  | May 31, 1988  |   |
| KSW                          | 2                     | 4,813,757            |                                      | Sakanao et al.                                  | March 21, 1989                                      |   |
| KSW                          | 3                     | 4,836,645            |                                      | Lefevre et al.                                  | June 6, 1989  |   |
| KSW                          | 4                     | 4,846,542            |                                      | Okayama et al.                                  | July 11, 1989                                       |   |
| KSW                          | 5                     | 4,956,682            |                                      | Ohnaka et al.                                   | September 11, 1990                                  |   |
| KSW                          | 6                     | 5,013,113            |                                      | Soref   | May 7, 1991   |   |
| KSW                          | 7                     | 5,231,683            |                                      | Hockaday et al.                                 | July 27, 1993                                       |   |
| KSW                          | 8                     | 5,347,601            |                                      | Ade et al.                                      | September 13, 1994                                  |   |
| KSW                          | 9                     | 5,511,142            |                                      | Horie, et al                                    | April 23, 1996                                      |   |
| KSW                          | 10                    | 5,581,643            |                                      | Wu  | December 3, 1996                                    |   |
| KSW                          | 11                    | 5,710,847            |                                      | Takano et al.                                   | January 20, 1998                                    |   |
| KSW                          | 12                    | 6,278,168 B1         |                                      | Day   | August 21, 2001                                     |   |
| KSW                          | 13                    | 6,393,272 B1         |                                      | Brinkman et al.                                 | May 21, 2002  |   |
| KSW                          | 14                    | 6,885,795            |                                      | Hsu et al.                                      | April 26, 2005                                      |   |
| KSW                          | 15                    | 6,921,490 B1         |                                      | Qian et al                                      | July 26, 2005                                       |   |
| KSW                          | 16                    | 2003/0133661A1       |                                      | Adibi, et al.                                   | July 17, 2003                                       |   |
| KSW                          | 17                    | 2003/0044118A1       |                                      | Zhou, et al.                                    | March 6, 2003                                       |   |

| <b>FOREIGN PATENT DOCUMENTS</b> |                       |                         |                     |                                      |  |   |   |                |
|---------------------------------|-----------------------|-------------------------|---------------------|--------------------------------------|--|---|---|----------------|
| Examiner Initials*              | Cite No. <sup>1</sup> | Foreign Patent Document |                     |                                      | Name of Patentee or Applicant of Cited Document  | Date of Publication of Cited Document<br>MM-DD-YYYY | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T <sup>6</sup> |
|                                 |                       | Office <sup>3</sup>     | Number <sup>4</sup> | Kind Code <sup>5</sup><br>(If known) |  |   |   |                |
| KSW                             | 18                    | EPO                     | 0849615A2           |                                      | Alcatel Alsthom Compagnie Generale D'Electricite |   |   |                |
| KSW                             | 19                    | EPO                     | 11064657            |                                      | Hitachi Cable Ltd.                               |   |   |                |
| KSW                             | 20                    | JP                      | 04358105A           |                                      | Fujitsu Ltd.                                     |   |   |                |
| KSW                             | 21                    | JP                      | 63197923            |                                      | NEC Corp   |   |   |                |

| <b>OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS</b> |                       |   |  |  |  |  |                |
|--|-----------------------|---|--|--|--|--|----------------|
| Examiner Initials*                                       | Cite No. <sup>1</sup> | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published |  |  |  |  | T <sup>6</sup> |
| KSW  | 22                    | ARONSON, L. B. et al., <i>Low-Cost Multimode WDM for Local Area Networks Up to 10 Gb/S</i> , IEEE Photonics Technology Letters, Vol. 10, No. 10, October 1998, pp 1489-1491.  |  |  |  |  |                |
| KSW  | 23                    | BABA, S. et al., <i>A Novel Integrated-Twin-Guide (ITG) Optical Switch with a Built-in TIR Region</i> , IEEE Photonics Technology Letters, Vol. 4, No. 5, May 1992, pp 486-488.   |  |  |  |  |                |
| KSW  | 24                    | BETTY, I. et al., <i>A Robust, Low-Crosstalk, InGaAsP/InP Total-Internal-Reflection Switch For Optical Cross-Connect Application</i>  |  |  |  |  |                |
| KSW  | 25                    | BRENNER, T. et al., <i>Vertical InP/InGaAsP Tapers for Low-Loss Optical Fibre-Waveguide Coupling</i> , Electronics Letters 22 <sup>nd</sup> October 1992 Vol. 28 No. 22, pp. 2040-2041.   |  |  |  |  |                |
| KSW  | 26                    | BURNS, W.K. et al., <i>Mode Conversion in Planar-Dielectric Separating Waveguides</i> , IEEE Journal of Quantum Electronics, VOL QE-11, No.1, Jan 1975; pg 32-39  |  |  |  |  |                |
| KSW  | 27                    | DUMBRAVESCU, N., <i>3-D Resolution Gray-Tone Lithography</i> , Proceedings of SPIE Vol. 4019 (2000) pp. 570-577.  |  |  |  |  |                |
| KSW  | 28                    | GOEL, K. et al <i>Design Considerations for Low Switching Voltage Crossing Channel Switches</i> , Journal of Lightwave Technology, VOL 6, No.6, June 1988; pg 881-886   |  |  |  |  |                |

Karen S. Wood 4/11/08

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## OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

| Examiner Initials* | Cite No. <sup>1</sup> | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published | T <sup>6</sup> |
|--------------------|-----------------------|---|----------------|
| KSW                | 29                    | GRANESTRAND, P. et al., <i>Integrated Optics 4x4 Switch Matrix with Digital Optical Switches</i> ; Electronics Letters, VOL 26, No.1, Jan 4, 1990; pg 4-5   |                |
| KSW                | 30                    | HIDA, Y. et al., <i>Highly Compact Silica-Based PLC-type 1x32 Splitters Using 127 <math>\mu</math>m-spacing Output and 0.4%-<math>\Delta</math> Waveguides</i> , Electronics Letters, VOL 34, No.1, Jan 8, 1998; pg 75-76                                     |                |
| KSW                | 31                    | HUANG, T.C. et al., <i>Depletion Edge Translation Waveguide Crossing Optical Switch</i> ; IEEE Photonics Technology Letters; VOL 1, No.7, Jul 1989, pg 168-170  |                |
| KSW                | 32                    | ITO, F. et al., <i>Carrier-Injection-Type Optical Switch In GaAs With A 1.06-1.55 <math>\mu</math>m Wavelength Range</i> ; Appl. Physics Letters, 54(2) Jan 9, 1989; pg 134-136   |                |
| KSW                | 33                    | Jeon, S. et al., <i>Simple Fabrication Method for Vertical Taper Using Tensile Stress-Induced Mask and Selective Etching Technique</i> , CLEO Pacific Rim '99 WR&, pp. 320-321.   |                |
| KSW                | 34                    | KASAHARA, R. et al., <i>Low-Power Consumption Silica-Based 2x2 Thermooptic Switch Using Trenched Silicon Substrate</i> , IEEE Photonics Technology Letters, VOL 11, No. 9, Sep 1999, pg 1132-1134   |                |
| KSW                | 35                    | KHAN, M.N. et al., <i>Fabrication-Tolerant, Low-Loss, and High-Speed Digital Optical Switches in InGaAsP/InP Quantum Wells</i> ; Proc 21 <sup>st</sup> Eur.Conf.on Opt.Comm.(ECOC '95-Brussels), pg 103-106   |                |
| KSW                | 36                    | KIRIHARA, T. et al., <i>Lossless And Low Crosstalk 4x4 Optical Switch Array</i> ; Electronics And Communications In Japan, Part 2, VOL 77, No.11, 1994, pg 73-81  |                |
| KSW                | 37                    | KIRIHARA, T. et al., <i>Lossless and Low-Crosstalk Characteristics in an InP-Based 2x2 Optical Switch</i> , IEEE Photonics Technology Letters, VOL 5, No. 9 Sept 1993, pg 1059-1061   |                |
| KSW                | 38                    | KLEY, et al., <i>Fabrication and Properties of Refractive Micro-Optical Profiles for Lenses, Lens arrays and Beam Shaping Elements</i> , Proceedings of SPIE Vol. 4231 (2000), pp 144-152.  |                |
| KSW                | 39                    | LIU, Y.L. et al., <i>Silicon 1x2 Digital Optical Switch Using Plasma Dispersion</i> ; Electronics Letters, VOL 30, No.2, Jan20, 1994; pg 130-131  |                |
| KSW                | 40                    | MOERMAN, I. et al., <i>A Review on Fabrication Technologies for the Monolithic Integration of Tapers with III-V Semiconductor Devices</i> ; IEEE Journal of Selected Topics in Quantum electronics, VOL 3, No.6, Dec. 1997, pg 1308-1320                      |                |
| KSW                | 41                    | MÜLLER, G. et al., <i>First Low Loss InP/InGaAsP Optical Switch with Integrated Mode Transformers</i> ; ThC12.10; Pg 37-40  |                |
| KSW                | 42                    | NAYYER, J. et al., <i>Analysis of Reflection-Type Optical Switches with Intersecting Waveguides</i> , Journal of Lightwave Technology, VOL 6, No.6, June 1988; pg 1146-1152   |                |
| KSW                | 43                    | NEGAMI, I. et al., <i>Guided-Wave Optical Wavelength Demultiplexer Using An Asymmetric Y Junction</i> ; Appl. Phys. Lett. 54 (12), Mar 20, 1989; pg 1080-1082   |                |
| KSW                | 44                    | NELSON, W. et al., <i>Optical Switching Expands Communications-Network Capacity</i> , Laser Focus World, Jun 1994, pg 517-520   |                |
| KSW                | 45                    | NELSON, W.H. et al., <i>Wavelength-and Polarization-Independent Large Angle InP/InGaAsP Digital Optical Switches with Extinction Ratios Exceeding 20 dB</i> ; IEEE Photonics Technology Letters, VOL 6, No.11, Nov. 1994; pg 1332-1334                        |                |
| KSW                | 46                    | OKAYAMA, H. et al., <i>8x8 Ti:LiNbO<sub>3</sub> Waveguide Digital Optical Switch Matrix</i> ; IEICE Trans. Commun.; VOL E77-B, No.2; Feb. 1994; pg 204-208  |                |
| KSW                | 47                    | OKAYAMA, H. et al., <i>Reduction of Voltage-Length Product for Y-Branch Digital Optical Switch</i> , Journal of Lightwave Technology, VOL 11, No.2, Feb 1993; pg 379-387  |                |
| KSW                | 48                    | PENNINGS E., <i>Integrated-Optic Versus Microoptic Devices for Fiber-Optic Telecommunication Systems: A Comparison</i> ; Journal of Selected Topics in Quantum Electronics, Vol. 2-No. 2, pp. 151-164.  |                |
| KSW                | 49                    | REIMER, K. et al., <i>Micro-Optic Fabrication Using One-Level Gray Tone Lithography</i> , SPIE Vol. 3008, pp 279-288.   |                |
| KSW                | 50                    | REIMER, K. et al., <i>One-Level Gray-Tone Lithography Mask Data Preparation and Pattern Transfer</i> , SPIE Vol. 2783, pp. 71-79.   |                |
| KSW                | 51                    | RENAUD, M. et al., <i>Compact Digital Optical Switches for Low Insertion Loss Large Switch Arrays on InP</i> ; Proc. 21 <sup>st</sup> Eur.Conf.on Opt. Comm. (ECOC '95-Brussels), pg 99-102   |                |
| KSW                | 52                    | RICKMAN, A. G. et al., <i>Silicon-on-Insulator Optical Rib Waveguide Loss and Mode Characteristics</i> , Journal of Lightwave Technology, October 1994, Vol. 12-No. 10, pp 1771-1776.   |                |
| KSW                | 53                    | ROLLAND, C. et al., <i>10 Gbit/s, 1.56 <math>\mu</math>m, Multiquantum Well InP/InGaAsP Mach-Zehnder Optical Modulator</i> , Electronics Letters, Mar 4, 1993, VOL 29, No.5, pg 471-472   |                |
| KSW                | 54                    | SILBERBERG, Y. et al., <i>Digital Optical Switch</i> ; Appl. Phys. Lett.; VOL 51, No.16, Oct 19, 1987, pg 152-154   |                |
| KSW                | 55                    | SNEH, A. et al., <i>Compact Low Crosstalk and Low Propagation Loss Quantum-Well Y-Branch Switches</i> ; PDP 4-1 ~ 4-5   |                |
| KSW                | 56                    | STOLL, L. et al., <i>1:8 Optical Matrix Switch on InP/InGaAsP with Integrated Mode Transformers</i> ; Optical Switches and Modulators II, pg 531-534  |                |

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|--------------------|----------------------|-----------------|---------------|
| Examiner Signature | <i>Kevin J. Wood</i> | Date Considered | <i>7/1/06</i> |
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|            |    |   |  |
|------------|----|---|--|
| <i>KSW</i> | 57 | SUGITA, A. et al., <i>Very Low insertion Loss Arrayed- Waveguide Grating with Vertically Tapered Waveguides</i> , IEEE Photonics Technology Letters, VOL 12, No. 9, Sept. 2000; pg 1180-1182.       |  |
| <i>KSW</i> | 58 | TADA, K. et al., <i>Bipolar Transistor Carrier-Injected Optical Modulator/Switch: Proposal and Analysis</i> , IEEE Electron Device Letters, VOL EDL-7, No.11, Nov 1986, pg 605-606                  |  |
| <i>KSW</i> | 59 | VINCHANT et al, <i>InP 4x1 Digital-Optical-Switch Module For Multiwavelength Cross-Connect Applications</i> ; OFC '95 Technical Digest, Thursday ThK2, pg 281-282                                   |  |
| <i>KSW</i> | 60 | VINCHANT, J.F. et al., <i>First Polarisation insensitive 4x4 Switch matrix on InP with Digital Optical Switches</i> , TuB7.3, pg 341-344  |  |
| <i>KSW</i> | 61 | VINCHANT, J.F. et al., <i>InP Digital Optical Switch: Key Element for Guided- Wave Photonic Switching</i> ; IEE Proceedings-J, VOL 140, No.5, Oct 1993; pg 301-307                                  |  |
| <i>KSW</i> | 62 | VINCHANT, J.F. et al., <i>Low Driving Voltage or Current Digital Optical Switch on InP for Multiwavelength System Applications</i> ; Electronics Letters, VOL 28, No.12, Jun 4, 1992; pg 1135-1137  |  |
| <i>KSW</i> | 63 | WANRU, Z. et al., <i>Total Internal Reflection Optical Switch with Injection Region Isolated by Oxygen Ion Implantation</i> ; pg 1-10   |  |
| <i>KSW</i> | 64 | YANAGAWA, H. et al., <i>Polarization-and Wavelength-Insensitive Guided-Wave Optical Switch with Semiconductor Y Junction</i> ; Journal of Lightwave Technology, VOL 8, No.8, Aug 1990, pg 1192-1197 |  |

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|--------------------|----------------------|-----------------|---------------|
| Examiner Signature | <i>Kerry J. Wood</i> | Date Considered | <i>7/1/06</i> |
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